

WHAT IS CLAIMED IS:

1. A method of manufacturing potassium niobate single crystal thin film,
comprising the steps of:

coating liquid drops of a potassium niobate solution on a substrate; and
5 precipitating orthorhombic potassium niobate single crystal from the liquid
drops.

2. The method as defined in Claim 1, wherein the step of coating liquid drops is
carried out by a liquid drop emission method.

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3. The method as defined in Claim 2, wherein a volume of the liquid drop is less
than 100 picoliters.

4. The method as defined in Claim 1, wherein the coating step and the precipitating
15 step are carried out repeatedly, and the coating is carried out so that the liquid drops to be
coated in a subsequent step overlap with at least a part of the orthorhombic potassium
niobate single crystal precipitated in a previous precipitating step.

5. The method as defined in Claim 1, wherein the potassium niobate solution is a
20 potassium niobate fluoride aqueous solution.

6. The method as defined in Claim 1, wherein the substrate has a crystallographic
axis on a surface thereof that is oriented in a direction perpendicular and in-plane to the
surface, and the potassium niobate single crystal is epitaxially grown on the substrate.

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7. The method as defined in Claim 6, wherein the substrate is a strontium titanate (100) single crystal substrate.

8. The method as defined in Claim 6, wherein the substrate comprises a silicon
5 single crystal substrate and a buffer layer epitaxially grown thereon.

9. The method as defined in Claim 8, wherein the buffer layer includes a first
buffer layer having a NaCl-type oxide and a second buffer layer having a simple
perovskite-type oxide epitaxially grown thereon.

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10. The method as defined in Claim 8, wherein the buffer layer includes a
fluorite-type oxide first buffer layer, and a second buffer layer that contains a layered
perovskite-type oxide epitaxially grown on the first buffer and a simple perovskite-type
oxide epitaxially grown on the perovskite-type oxide.

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11. The method as defined in Claim 6, wherein the substrate includes one of a
crystal, quartz, SiO₂ covered silicon, and diamond-covered silicon, and a buffer layer
formed thereon, and wherein the buffer layer includes a first buffer layer grown on the
substrate in in-plane orientation independently of crystal orientation of a surface of the
20 substrate and a second buffer layer having oxide epitaxially grown thereon, the first and
second buffer layers manufactured by a vapor deposition method accompanying ion
beam irradiation.

12. The method as defined in Claim 11, wherein the first buffer layer is
25 manufactured by a NaCl-type oxide, and the second buffer layer is manufactured by a

simple perovskite-type oxide.

13. The method as defined in Claim 11, wherein the first buffer layer is manufactured by a fluorite-type oxide, and wherein the second buffer layer is

5 manufactured by a layered perovskite-type oxide and a simple perovskite-type oxide grown epitaxially thereon.

14. A surface acoustic wave element comprising a potassium niobate single crystal thin film produced by the manufacturing method as defined in Claim 1.

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15. A frequency filter comprising a surface acoustic wave element as defined in Claim 14.

16. A frequency oscillator comprising a surface acoustic wave element as defined in
15 Claim 14.

17. An electronic circuit comprising a frequency oscillator as defined in Claim 14.

18. An electronic apparatus comprising at least one of a frequency filter as defined in Claim 15, a frequency oscillator as defined in Claim 16, and an electronic circuit as
20 defined in Claim 1.